

Claims

1. An exercise apparatus comprising:

a master control unit;

a first sensor, in communication with the master control unit, which generates a first signal indicative of an effective tread speed for the apparatus; and

a resistive element that includes at least one resistance level.
2. The exercise apparatus of claim 1 further comprising a data structure containing data indicative of the amount of energy expended for a given resistance level.
3. The exercise apparatus of claim 2, wherein the master control unit accesses the data structure and determines the amount of energy expended based upon at least one of the first signal and at least one resistance level.
4. The exercise apparatus of claim 1 further comprising a second sensor, in communication with the master control unit, which generates at least one second signal with each downward movement of a treadle.
5. The exercise apparatus of claim 4, wherein the master control unit calculates the amount of energy expended based upon the received first and second signals.
6. The exercise apparatus of claim 5, further comprising a data structure containing data indicative of the amount of energy expended for at least one of a given effective tread speed and a given resistance level; and the master control unit utilizes data from the data structure in calculating the amount of energy expended.
7. The exercise apparatus of claim 1 wherein the apparatus includes at least one tread and the resistive element imparts a first force upon the tread in a substantially vertical direction.

8. The exercise apparatus of claim 7 wherein the force imparted by the resistive element counteracts at least a portion if not all of a second force imparted upon the tread by an exerciser.

9. The exercise apparatus of claim 7 wherein the master control unit controls the effective tread speed for each of the at least one treads in a substantially horizontal direction.

10. The exercise apparatus of claim 1 further comprising a tread control unit, in communication with the master control unit, which controls the rotation of at least one tread on the apparatus.

11. The exercise apparatus of claim 10, wherein the master control unit controls the operation of the tread control unit.

12. The exercise apparatus of claim 11, wherein the master control unit controls the operation of the tread control unit based at least upon the first signal.

13. The exercise apparatus of claim 11, wherein the tread control unit further comprises at least one of a D.C. motor and an A.C. motor.

14. The exercise apparatus of claim 1, wherein the apparatus may be configured such that striding, stepping or combined striding and stepping motions are facilitated by the apparatus.

15. The exercise apparatus of claim 14, wherein the master control unit determines whether striding, stepping and/or combined striding and stepping motions are to be facilitated by the apparatus based upon at least one of a desired effective tread speed and a desired resistance level.

16. The exercise apparatus of claim 15, wherein at least one of the desired effective tread speed and the desired resistance level are specified via a user interface.

17. The exercise apparatus of claim 14, wherein the master control unit determines that stepping or combined striding and stepping motions are to be facilitated by the apparatus based upon resistance level.

18. The exercise apparatus of claim 1, wherein the apparatus may be configured to operate as at least one of a treadmill, a stepper and a combined treadmill and stepper.

19. The exercise apparatus of claim 4, wherein the master control unit determines the amount of calories expended based upon the second signal when the first sensor provides a null reading.

20. The exercise apparatus of claim 19, wherein the apparatus is configured in stepping mode.

21. The exercise apparatus of claim 4, wherein the master control unit determines the amount of energy expended based upon the first signal when the second signal provides a null reading.

22. The exercise apparatus of claim 21, wherein the apparatus is configured in treadmill only mode.

23. A system for controlling the operation of an exercise device which may be configured to operate as a treadmill, a stepper, or a combined treadmill and stepper, comprising:

a processor;

a first sensor, in communication with the processor, for sensing a substantially horizontal motion by a tread in the exercise device and generating a first signal indicative thereof;

a second sensor, in communication with the processor, for sensing a substantially vertical motion by the tread and generating a second signal indicative thereof; and

a data storage device, containing in a data structure information useful in determining the amount of energy expended based upon the first signal and/or the second signal.

24. The system of claim 23, wherein the processor controls the operation of the exercise device based upon at least one of the first signal and the second signal.

25. The system of claim 23, whereupon receiving the first signal over a given time period, the processor determines an average effective tread speed over the given time period, accesses data from the data structure based upon a resistance level, and based upon the average effective tread speed and the data determines the effort expended over the given time period.

26. An article of manufacture, comprising:
a computer usable medium having computer readable program code means embodied therein for selecting a mode for an exercise apparatus, the computer readable program code means further comprising:

a computer readable program code means for selecting a treadmill mode; and

a computer readable program code means for selecting a stepper mode.

27. The article of manufacture of claim 26, wherein the computer usable medium further comprises a computer readable program code means for selecting a combination striding and stepping mode.

28. An apparatus, comprising:
a computer usable medium having computer readable program code means embodied therein for selecting a mode for the apparatus, comprising at least any two of:

a computer readable program code means for selecting a treadmill mode;

a computer readable program code means for selecting a stepper mode; and

a computer readable program code means for selecting a combined treadmill and stepper mode.

29. A control system for an exercise apparatus, comprising:

a master control unit; and

a memory device for holding a data structure for access by the master control unit,

wherein the data structure contains at least one data element utilized in determining the effort exerted during use of the exercise apparatus,

wherein the exercise apparatus is configurable into a stepper mode and a treadmill mode.

30. The control system of claim 29 wherein the exercise apparatus is further configurable into a combined stepper and treadmill mode.

31. A program memory or storage device accessible by a processor, tangibly embodying a program of instructions executable by the processor to configure an exercise apparatus into one of a plurality of modes, by:

receiving at least one user input signal; and

based upon the received user input signal, selecting from one of many exercise modes supported by the exercise apparatus.

32. The program memory or storage device of claim 31, wherein the many exercise modes supported by the exercise apparatus include a stepper mode and at least one of a treadmill mode and a combined treadmill and stepper mode.

33. A method of determining the energy expended during use of an exercise device having a combined treadmill and stepper function, wherein the exercise machine includes dual treadle assemblies operating at a number of steps per minute and having respective treads operating at an effective tread speed, comprising:

receiving a first value indicative of a specified weight;
receiving a second value indicative of a resistance setting on the exercise device;
receiving a third value indicative of an effective tread speed for the exercise device;
receiving at least one fourth value indicative of $V0^2$ expended by a population of exercisers over a range of resistances for the combined treadmill and stepper functions; and
calculating calories burned as a function of the first value, the second value, the third value and the at least one fourth value.

34. A method of monitoring a workout on an exercise machine configurable for a treadmill workout or for a stepper workout, wherein the exercise machine includes dual treadle assemblies operating at a number of steps per minute during stepper mode and having respective treads operating at an effective tread speed during treadmill mode, comprising:

receiving a first value indicative of a weight;
receiving a second value indicative of a resistance level for the exercise machine;
selecting either the stepper mode or the treadmill mode as a function of the second value;
when treadmill mode is selected:
receiving a first signal indicative of an effective tread speed; and
calculating calories burned as a function of the first value, the second value, the first signal, and empirical data indicative of $V0^2$ expended by a population of exercisers for the treadmill mode; and
when in stepper mode:
receiving a second signal indicative of the number of steps per minute accomplished; and

calculating calories burned as a function of the first value, the second value, the second signal, and empirical data indicative of $\dot{V}O_2$ expended by a population of exercisers for the stepper mode.